

Remarks

Claims 1 and 3 – 5 are pending.

Claim 1 has been amended to delete the phrase “and the necessary hardness, strength and wear resistance.” Accordingly, the rejection of the claims under USC 112 is believed moot.

As a preliminary matter, applicant believes the office action mistakenly cites Mannesman rather than Jordan on page 2. Nonetheless, as will be evident, applicant submits that Jordan is also deficient (like Mannesman) and the current rejection should similarly be withdrawn.

The rejection of claims 1, 3-5 under 35 USC 103(a) as being unpatentable over Jordan is respectfully traversed. Applicant's claims are directed to a process that recites, *inter alia*, “subjecting the tube to axial forces and a medium under high internal pressure so that the tube expands to form said cam regions, wherein the diameter of the tube in said region are greater than the diameter of the tube at the non cam regions.” In contrast, Jordan does not mention using “axial forces”, but rather discloses using only a rubber rod (or hydraulic or electrohydraulic means) to expand their tube.

In this respect, the office action (on page 4) appears to reason that Jordan discloses applicant's “axial forces” to wit:

“subjecting the tube to axial forces and a medium under high internal pressure (the tube would undergo axial forces from the die and high internal pressure via the hydraulic fluid used to expand it within the die)...”

Applicant respectfully submits, however, that this interpretation is in correct for the following reasons:

First, nowhere in Jordan do they expressly mention axial forces, let alone applying them to the ends of their tubes.

Second, with regards to any type of pressure that might be exerted by the die Jordan mentions only:

“To this end, the cam rings and bearing rings are inserted into a die which corresponds to their outer shape in order to be sure that the widening of the hollow shaft will not cause any deformation thereof. The widening of the hollow shaft is effected advantageously by means of a rubber rod which substantially corresponds to the inner diameter of said hollow shaft or tubular member and which is compressed from the oppositely located end faces.” (emphasis added; see col. 2, lines 18 – 21).

Thus, it is not even necessarily so from Jordan’s own teachings that the die applies or contributes to applying any axial forces. Accordingly, this “inherent” teaching in Jordan is misplaced.

In this respect, Jordan discloses insertion of a rubber rod into the hollow shaft for widening the hollow shaft, however, this rubber rod does not apply an axial force to the ends of the shaft but the force acts inside the shaft. As an alternative widening can also be performed by hydraulic or electro-hydraulic means, which may correspond to the application of high internal pressure but no axial force is applied in this case, either. Using dies according to Jordan is simply done in order to position cam rings and bearer rings at the desired areas of the hollow shaft and in order to avoid widening of the shaft at positions without cam or bearer rings.

Third, Jordan does not disclose axial pressures because he is using a rod or hydraulic means to expand his tube and thus does not have to concern himself of leakage of the “internal pressure”. In contrast, applicant submits that during the IHU process shrinkage with respect to the length of the tube will arise. This means that the axial end of the carrier tube 4 and the end piece 2 are no longer in contact. If the end piece and the tube are not in contact it is not possible to uphold the necessary pressure within the tube. Please note that the pressures in an IHU process are very high, namely about 2.000bar (2×10^8 Pa). If this pressure leaks from inside the tube no expansion of the carrier tube will be possible. Hence, applicant’s claims recite “subjecting the tube to axial forces...” Accordingly, not only does

Jordan not disclosed 'subjecting the tube to axial forces...' but a person of skill in the art reading Jordan would not be motivated to modify Jordan with the application of axial forces.


Fourth, the total absence of using an axial force in Jordan is analogous to the situation observed in Mannesman, which also appears to use a die (and hydromechanical expansion means). In that case the examiner appeared to have been persuaded by applicant's previous and sole argument that Mannesman did not show axial forces.

Applicants believe the claims are in condition for allowance and respectfully solicit a Notice of Allowance.

The Commissioner is hereby authorized to charge payment of any fees required associated with this communication or credit any overpayment to Deposit Account No. 50-3881. If an extension of time is required, please consider this a petition therefore and charge any additional fees which may be required to Deposit Account No. 50-3881. A duplicate copy of this paper is enclosed.

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Respectfully submitted,

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